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BOOK REVIEWS AND NOTES.

A First Course in Nomography. By *S. Brodetsky*. London: G. Bell & Sons, Ltd., 1921. Pp. x, 135. Price, 10s. net.

Nomography owes its name, and to a large extent its development to d'Ocagne; and as a science it is best studied in d'Ocagne's own work, *Traité de Nomographie* (G. Villars, Paris, 1899). There are, however, numerous classes of students, to whom the methods of nomography are of great service; whereas, at any rate in their eyes, the science that underlies the subject is of secondary importance only. The great advantages possessed by nomograms was brought into prominence during the war; and in recent engineering treatises it is quite a customary matter to find one or more nomograms, more especially in connection with empirical formulae. For these reasons, I consider that Dr. Brodetsky, in keeping before his eyes the needs of such students, and the fact that any mathematical knowledge they have will be of the "practical" order, has made a very wise choice in his method of presentment. He states in his preface that this choice was based on experience gained in making nomograms for various technological departments in the University, and in other ways. Hence, at the very least, the elementary and clear treatment given in the book under review has the merit that it is based on real practical experience.

It certainly would have been helpful to many readers if the author had inserted, on p. 11, a geometrical figure and proof of the method for finding the ordinate of a point dividing the line joining two given points in a given ratio; but otherwise the work runs very clearly through the addition formulae, such as $la+mb$, with equally divided scales, to product formulae, such as $a^l b^m$, with logarithmic scales, and the generalisations of each. Also, it might have been wise to have compared the use of nomograms with the use of the slide-rule, and the analogy between reference lines and the cursor in simple cases; but, of course, this is not essential.

In Chapter V, the theory of parallel co-ordinates is given; and in Chapter VI, this is applied to such transcendant formulae as $nt = \phi - e \sin\phi$, and various trigonometrical formulae and equations. Chapter VII gives examples of the use of intersecting scales; and Chapter VIII gives details of empirically constructed scales, such as for the solution of $bx = a^x$. This closes a highly interesting and eminently practicable introduction to nomography, which should find a large public.

J. M. Childs.

Elementary Vector Analysis. By *C. E. Weatherburn*. London: G. Bell & Sons, Ltd., 1921. Pp. xxviii, 184. Price, 12s. net.

We welcome this elementary treatise on Vector Analysis as a book that has been wanted in English for some time. The author confines himself entirely to the elementary parts of the subject, but treats them very fully. Many applications of vectors to geometry, kinematics, to dynamics, both of rigid bodies and of a particle, and to statics are given. To get the student of dynamics to think in terms of vectors is wholly to the good; for, apart from the greater elegance of vector methods, it gives him a much clearer realization of the physical realities of the problems than is attained by the ordinary analytical methods.

The more advanced parts of the subject dealing with "curls," "gradients" and "divergence," which are of such fundamental importance in the study of Electromagnetism, are omitted. It is to be hoped that the author will supplement the present work by another volume dealing with these more advanced portions, which will be as valuable to students of Electromagnetism as the present volume is to students of dynamics for whom these higher portions are unnecessary.

A word is perhaps necessary on the notation adopted for the scalar and vector product of two vectors. The author discards the familiar brackets ( ) and [ ] for these products and uses a dot and a cross respectively between the terms. One must admit that in actual work this notation is more convenient, as the brackets are then available for ordinary algebraical needs; but some uniformity of practice among writers is urgently to be desired. The subject is quite sufficiently developed now to insist upon the adoption of some standard notation for it.

Albert Eagle.